

The 2016 updated list of QPS status recommended biological agents in support of EFSA risk assessments

The list of QPS status recommended biological agents (EFSA BIOHAZ Panel, 2016) is being maintained in accordance with the self-task mandate of the BIOHAZ Panel (2017-2019). Possible additions to this list are included around every 6 months, with the first Panel Statement adopted in June 2017 and the last Panel Statement planned for adoption in December 2019. These additions are published as updates to the Scientific Opinion (EFSA BIOHAZ Panel, 2016) available at <https://doi.org/10.2903/j.efsa.2017.4664> and, as of January 2018, also as supporting information linked to every Panel Statement available on the Knowledge Junction at <https://doi.org.10.5281/zenodo.1146566>.

Table 1: The 2016 updated list of QPS status recommended biological agents for safety risk assessments carried out by EFSA Scientific Panels and Units

Bacteria			
Gram-positive non-spore forming bacteria			
Species			Qualifications^(a)
<i>Bifidobacterium adolescentis</i>	<i>Bifidobacterium bifidum</i>	<i>Bifidobacterium longum</i>	
<i>Bifidobacterium animalis</i>	<i>Bifidobacterium breve</i>		
<i>Carnobacterium divergens</i> ^(f)			
<i>Corynebacterium glutamicum</i> ^(b)			QPS only applies when the species is used for amino acid production.
<i>Lactobacillus acidophilus</i>	<i>Lactobacillus delbrueckii</i>	<i>Lactobacillus panis</i>	
<i>Lactobacillus amyolyticus</i>	<i>Lactobacillus diolivorans</i> ⁽ⁱ⁾	<i>Lactobacillus paracasei</i>	
<i>Lactobacillus amylovorus</i>	<i>Lactobacillus farciminis</i>	<i>Lactobacillus</i>	
<i>Lactobacillus animalis</i> ^(k)	<i>Lactobacillus fermentum</i>	<i>paraplantarum</i>	
<i>Lactobacillus alimentarius</i>	<i>Lactobacillus gallinarum</i>	<i>Lactobacillus pentosus</i>	
<i>Lactobacillus aviaries</i>	<i>Lactobacillus gasseri</i>	<i>Lactobacillus plantarum</i>	
<i>Lactobacillus brevis</i>	<i>Lactobacillus helveticus</i>	<i>Lactobacillus pontis</i>	
<i>Lactobacillus buchneri</i>	<i>Lactobacillus hilgardii</i>	<i>Lactobacillus reuteri</i>	
<i>Lactobacillus casei</i> ^(c)	<i>Lactobacillus johnsonii</i>	<i>Lactobacillus rhamnosus</i>	
<i>Lactobacillus cellobiosus</i>	<i>Lactobacillus</i>	<i>Lactobacillus sakei</i>	
<i>Lactobacillus collinoides</i>	<i>kefirnofaciens</i>	<i>Lactobacillus salivarius</i>	
<i>Lactobacillus coryniformis</i>	<i>Lactobacillus kefir</i>	<i>Lactobacillus</i>	
<i>Lactobacillus crispatus</i>	<i>Lactobacillus mucosae</i>	<i>sanfranciscensis</i>	
<i>Lactobacillus curvatus</i>			
<i>Lactococcus lactis</i>			
<i>Leuconostoc citreum</i>	<i>Leuconostoc mesenteroides</i>	<i>Leuconostoc</i>	
<i>Leuconostoc lactis</i>		<i>pseudomesenteroides</i>	
<i>Microbacterium imperiale</i> ^(f)			QPS only applies when the species is used for enzyme production.
<i>Oenococcus oeni</i>			
<i>Pasteuria nishizawae</i> ^(h)			
<i>Pediococcus acidilactici</i>	<i>Pediococcus parvulus</i> ⁽ⁱ⁾	<i>Pediococcus pentosaceus</i>	
<i>Pediococcus dextrinicus</i>			
<i>Propionibacterium acidipropionici</i>	<i>Propionibacterium freudenreichii</i>		
<i>Streptococcus thermophilus</i>			

Gram-positive spore-forming bacteria			
Bacillus			
Species			Qualifications^(a)
<i>Bacillus amyloliquefaciens</i>	<i>Bacillus fusiformis</i>	<i>Bacillus mojavenis</i>	Absence of toxigenic activity.
<i>Bacillus atropheus</i>	<i>Bacillus lentus</i>	<i>Bacillus pumilus</i>	
<i>Bacillus clausii</i>	<i>Bacillus licheniformis</i>	<i>Bacillus smithii⁽¹⁾</i>	
<i>Bacillus coagulans</i>	<i>Bacillus megaterium</i>	<i>Bacillus subtilis</i>	
<i>Bacillus flexus⁽¹⁾</i>		<i>Bacillus vallismortis</i>	
<i>Geobacillus stearothermophilus</i>			
Gram-negative bacteria			
Species			Qualifications^(a)
<i>Gluconobacter oxydans</i>			QPS only applies when the species is used for vitamin production.
<i>Xanthomonas campestris⁽⁹⁾</i>			QPS only applies when the species is used for the production of xanthan gum.
Yeasts^(e)			
Species			Qualifications
<i>Candida cylindracea^(f)</i>			QPS only applies when the species is used for enzyme production.
<i>Debaryomyces hansenii</i>			
<i>Hanseniaspora uvarum</i>			
<i>Kluyveromyces lactis</i>	<i>Kluyveromyces marxianus</i>		QPS only applies when the species is used for enzyme production.
<i>Komagataella pastoris</i>	<i>Komagataella phaffi⁽¹⁾</i>		
<i>Lindnera jadinii</i>			QPS only applies when the species is used for enzyme production.
<i>Ogataea angusta</i>			QPS only applies when the species is used for enzyme production.
<i>Saccharomyces bayanus</i>	<i>Saccharomyces cerevisiae^(d)</i>	<i>Saccharomyces pastorianus</i>	Absence of resistance to antimycotics used for medical treatment of yeast infections in cases where viable cells are added to the food or feed chain. In the case of <i>Saccharomyces cerevisiae</i> this qualification applies for yeast strains able to grow above 37°C.
<i>Schizosaccharomyces pombe</i>			QPS only applies when the species is used for enzyme production. Absence of resistance to antimycotics used for medical treatment of yeast infections in cases where viable cells are added to the food or feed chain.
<i>Wickerhamomyces anomalus</i>			
<i>Xanthophyllomyces dendrorhous</i>			
<i>Yarrowia lipolytica^(m)</i>			QPS only applies for production purposes ⁽ⁿ⁾

Viruses	
Plant viruses	
Family	
Alphaflexiviridae	Potyviridae
Insect viruses	
Family	
Baculoviridae	

A specific representative of a QPS proposed taxonomic unit, does not need to undergo a further safety assessment other than to satisfy the specified qualifications, if applicable. On the other hand, representatives of taxonomic units that fail to satisfy a qualification would be considered unfit for the QPS list and would remain subject to a full safety assessment, in the frame of a notification by the responsible EFSA Scientific Panel.

- (a): Generic qualification for all QPS bacterial taxonomic units: the strains should not harbour any acquired antimicrobial resistance genes to clinically relevant antimicrobials.
- (b): *Brevibacterium lactofermentum* is a synonym of *Corynebacterium glutamicum*.
- (c): The previously described species '*Lactobacillus zeae*' has been included in the species *Lactobacillus casei*.
- (d): *Saccharomyces cerevisiae*, subtype *boulardii* is contraindicated for persons with fragile health, as well as for patients with a central venous catheter in place.
- (e): Yeast synonyms commonly used in the feed/food industry:
 - Debaryomyces hansenii*- anamorph *Candida famata*;
 - Hanseniaspora uvarum*- anamorph *Kloeckera apiculata*;
 - Kluyveromyces lactis*- anamorph *Candida spherica*;
 - Kluyveromyces marxianus*- anamorph *Candida kefyri*;
 - Komagataella pastoris*- synonym *Pichia pastoris*;
 - Lindnera jadinii*- synonyms *Pichia jadinii*, *Hansenula jadinii*, *Torulopsis utilis*, anamorph *Candida utilis*;
 - Ogataea angusta*- synonym *Pichia angusta*;
 - Saccharomyces cerevisiae*- synonym *Saccharomyces boulardii*;
 - Saccharomyces pastorianus*- synonym *Saccharomyces carlsbergensis*;
 - Wickerhamomyces anomalus*- synonyms *Hansenula anomala*, *Pichia anomala*, *Saccharomyces anomalus*, anamorph *Candida pelliculosa*;
 - Xanthophyllomyces dendrorhous*- anamorph *Phaffia rhodozyma*.
- (f): Microorganisms recommended in the Panel Statement published in December 2014 (EFSA BIOHAZ Panel, 2014).
- (g): Microorganisms recommended in the Panel Statement published in June 2015 (EFSA BIOHAZ Panel, 2015a).
- (h): Microorganisms recommended in the Panel Statement published in December 2015 (EFSA BIOHAZ Panel, 2015b).
- (i): Microorganisms recommended in the Panel Statement published in July 2016 (EFSA BIOHAZ Panel, 2016).
- (j): Microorganisms recommended in the Panel Statement published in March 2017 (EFSA BIOHAZ Panel et al., 2017a).
- (k): Microorganisms recommended in the Panel Statement published in July 2017 (EFSA BIOHAZ Panel, 2017b).
- (l): Microorganisms recommended in the Panel Statement published in January 2018 (EFSA BIOHAZ Panel, 2018a).
- (m): Microorganisms recommended in the Panel Statement published in July 2018 (EFSA BIOHAZ Panel, 2018b).
- (n): The qualification 'for production purpose only' implies the absence of viable cells of the production organism in the final product and can also be applied for food and feed products based on microbial biomass.

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