Patent Claims

1. A method for hydrolytic cleavage of zearalenone or at least one zearalenone derivative selected from the group of α-ZEL ((2E,7R,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]-octadeca-1(18),2,14,16-tetraen-13-one), β-ZEL (2E,7S,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(18),2,14,16-tetraen-13-one), α-ZAL ((7R,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(18),14,16-trien-13-one), β-ZAL ((7S,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(14),15,17-trien-13-one), Z14G ((2E,11S)-15-hydroxy-11-methyl-17-[(3R,4S,5S,6R)-3,4,5-trihydroxy-6-(hydroxymethyl)-tetrahydropyran-2-yl]oxy-12-oxabicyclo[12.4.0]octadeca 1(18)2,14,16-tetraene-7,13-dione), Z14S ([(2E,11S)-15-hydroxy-11-methyl-7,13-dioxo-12-oxabicyclo[12.4.0]octadeca-1(18),2,14,16-tetraen-17-yl] hydrogen sulfate) and ZAN ((11S)-15,17-dihydroxy-11-methyl-12-oxabicyclo-[12.4.0]octadeca-1(18),14,16-triene-7,13-dione), wherein the zearalenone or at least one zearalenone derivative is/are hydrolyzed by a polypeptide having an amino acid sequence of sequence ID number 6 or a functional variant thereof, wherein the sequence identity between the functional variant and sequence ID number 6 is at least 70%; and wherein the polypeptide having the amino acid sequence of SEQ ID NO: 6 or the functional variant thereof has an α,β-hydrolase structure, which is suitable for oxygen-independent and cofactor-free hydrolytic cleavage of the ester group of zearalenone or at least one zearalenone derivative selected from the group of α-ZEL ((2E,7R,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]-octadeca-1(18),2,14,16-tetraen-13-one), β-ZEL (2E,7S,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(18),2,14,16-tetraen-13-one), α-ZAL ((7R,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(18),14,16-trien-13-one), β-ZAL ((7S,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(14),15,17-trien-13-one), Z14G ((2E,11S)-15-hydroxy-11-methyl-17-[(3R,4S,5S,6R)-3,4,5-trihydroxy-6-

(hydroxymethyl)-tetrahydropyran-2-yl]oxy-12-oxabicyclo[12.4.0]octadeca 1(18)2,14,16-tetraene-7,13-dione), Z14S ([(2E,11S)-15-hydroxy-11-methyl-7,13-dioxo-12-oxabicyclo[12.4.0]octadeca-1(18),2,14,16-tetraen-17-yl] hydrogen sulfate) and ZAN ((11S)-15,17-dihydroxy-11-methyl-12-oxabicyclo-[12.4.0]octadeca-1(18),14,16-triene-7,13-dione).

2. A method for hydrolytic cleavage of zearalenone or at least one zearalenone derivative selected from the group of α-ZEL ((2E,7R,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]-octadeca-1(18),2,14,16-tetraen-13-one), β-ZEL (2E,7S,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(18),2,14,16-tetraen-13-one), α-ZAL ((7R,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(18),14,16-trien-13-one), β-ZAL ((7S,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(14),15,17-trien-13-one), Z14G ((2E,11S)-15-hydroxy-11-methyl-17-[(3R,4S,5S,6R)-3,4,5-trihydroxy-6-(hydroxymethyl)-tetrahydropyran-2-yl]oxy-12-oxabicyclo[12.4.0]octadeca 1(18)2,14,16-tetraene-7,13-dione), Z14S ([(2E,11S)-15-hydroxy-11-methyl-7,13-dioxo-12-oxabicyclo[12.4.0]octadeca-1(18),2,14,16-tetraen-17-yl] hydrogen sulfate) and ZAN ((11S)-15,17-dihydroxy-11-methyl-12-oxabicyclo-[12.4.0]octadeca-1(18),14,16-triene-7,13-dione), wherein the zearalenone or at least one zearalenone derivative is/are hydrolyzed by a polypeptide having an amino acid sequence of sequence ID number 6 or a functional variant thereof, wherein the sequence identity between the functional variant and the sequence ID number 6 is at least 70%, wherein the polypeptide is used in an additive to yield feed products for pigs, poultry or aquaculture, for addition to foodstuffs or to distillers dried grain and solubles, and wherein the additive contains the polypeptide and auxiliary substances; and wherein the polypeptide having the amino acid sequence of SEQ ID NO: 6 or the functional variant thereof has an α,β-hydrolase structure, which is suitable for oxygen-independent and cofactor-free

hydrolytic cleavage of the ester group of zearalenone or at least one zearalenone derivative selected from the group of α-ZEL ((2E,7R,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]-octadeca-1(18),2,14,16-tetraen-13-one), β-ZEL (2E,7S,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(18),2,14,16-tetraen-13-one), α-ZAL ((7R,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(18),14,16-trien-13-one), β-ZAL ((7S,11 S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(14),15,17-trien-13-one), Z14G ((2E,11S)-15-hydroxy-11-methyl-17-[(3R,4S,5S,6R)-3,4,5-trihydroxy-6-(hydroxymethyl)-tetrahydropyran-2-yl]oxy-12-oxabicyclo[12.4.0]octadeca 1(18)2,14,16-tetraene-7,13-dione), Z14S ([(2E,11S)-15-hydroxy-11-methyl-7,13-dioxo-12-oxabicyclo[12.4.0]octadeca-1(18),2,14,16-tetraen-17-yl] hydrogen sulfate) and ZAN ((11S)-15,17-dihydroxy-11-methyl-12-oxabicyclo-[12.4.0]octadeca-1(18),14,16-triene-7,13-dione).

3. The method according to claim 2, wherein the polypeptide or the additive is mixed with a foodstuff or animal feed product contaminated with zearalenone or with at least one zearalenone derivative; the contaminated foodstuff or animal feed product is brought in contact with moisture, and the polypeptide or the additive hydrolyzes the zearalenone or at least one zearalenone derivative present in contaminated foodstuff or animal feed product.

4. The method according to claim 1, wherein at least 70% of the zearalenone or at least one zearalenone derivative selected from the group of α-ZEL ((2E,7R,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]-octadeca-1(18),2,14,16-tetraen-13-one), β-ZEL (2E,7S,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(18),2,14,16-tetraen-13-one), α-ZAL ((7R,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(18),14,16-trien-13-one), β-ZAL ((7S,11S)-7,15,17-

trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(14),15,17-trien-13-one), Z14G ((2E,11S)-15-hydroxy-11-methyl-17-[(3R,4S,5S,6R)-3,4,5-trihydroxy-6-(hydroxymethyl)-tetrahydropyran-2-yl]oxy-12-oxabicyclo[12.4.0]octadeca 1(18)2,14,16-tetraene-7,13-dione), Z14S ([(2E,11S)-15-hydroxy-11-methyl-7,13-dioxo-12-oxabicyclo[12.4.0]octadeca-1(18),2,14,16-tetraen-17-yl] hydrogen sulfate) and ZAN ((11S)-15,17-dihydroxy-11-methyl-12-oxabicyclo-[12.4.0]octadeca-1(18),14,16-triene-7,13-dione), is/are hydrolyzed.

5. The method according to claim 4, wherein at least 80% of the zearalenone or at least one zearalenone derivative selected from the group of α-ZEL ((2E,7R,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]-octadeca-1(18),2,14,16-tetraen-13-one), β-ZEL (2E,7S,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(18),2,14,16-tetraen-13-one), α-ZAL ((7R,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(18),14,16-trien-13-one), β-ZAL ((7S,11 S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(14),15,17-trien-13-one), Z14G ((2E,11S)-15-hydroxy-11-methyl-17-[(3R,4S,5S,6R)-3,4,5-trihydroxy-6-(hydroxymethyl)-tetrahydropyran-2-yl]oxy-12-oxabicyclo[12.4.0]octadeca 1(18)2,14,16-tetraene-7,13-dione), Z14S ([(2E,11S)-15-hydroxy-11-methyl-7,13-dioxo-12-oxabicyclo[12.4.0]octadeca-1(18),2,14,16-tetraen-17-yl] hydrogen sulfate) and ZAN ((11S)-15,17-dihydroxy-11-methyl-12-oxabicyclo-[12.4.0]octadeca-1 (18),14,16-triene-7,13-dione), is/are hydrolyzed.

6. The method according to claim 4, wherein at least 90% of the zearalenone or at least one zearalenone derivative selected from the group of α-ZEL ((2E,7R,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]-octadeca-1(18),2,14,16-tetraen-13-one), β-ZEL (2E,7S,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1(18),2,14,16-tetraen-13-one), α-ZAL ((7R,11S)-7,15,17-trihydroxy-11-methyl-12-

oxabicyclo[12.4.0]octadeca-1(18),14,16-trien-13-one), β-ZAL ((7S,11S)-7,15,17-trihydroxy-11-methyl-12-oxabicyclo[12.4.0]octadeca-1 (14),15,17-trien-13-one), Z14G ((2E,11S)-15-hydroxy-11-methyl-17-[(3R,4S,5S,6R)-3,4,5-trihydroxy-6-(hydroxymethyl)-tetrahydropyran-2-yl]oxy-12-oxabicyclo[12.4.0]octadeca 1(18)2,14,16-tetraene-7,13-dione), Z14S ([(2E,11S)-15-hydroxy-11-methyl-7,13-dioxo-12-oxabicyclo[12.4.0]octadeca-1(18),2,14,16-tetraen-17-yl] hydrogen sulfate) and ZAN ((11S)-15,17-dihydroxy-11-methyl-12-oxabicyclo-[12.4.0]octadeca-1 (18),14,16-triene-7,13-dione), is/are hydrolyzed.