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(54) **COMBINATION AND/OR COMPRISING BACILLUS, AND YUCCA, QUILLAJA, OR BOTH AND A METHOD FOR USING AND MAKING**

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(58) **Field of Classification Search**
None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,485,734 B1	11/2002	Baker et al.
9,999,648 B2 *	6/2018	Calabotta
2011/0256216 A1	10/2011	Lefkowitz

FOREIGN PATENT DOCUMENTS

CN	103289910	9/2013
JP	07-107923	4/1995
JP	08-099884	4/1996
JP	08-131089	5/1996
JP	2002-370993	12/2002
JP	2006-061092	3/2006
KR	2012-0069221	6/2012
WO	WO 93/14187	7/1993
WO	WO 94/11492	5/1994

(Continued)

OTHER PUBLICATIONS

Ashida et al., "Protection of Japanese Flounder *Paralichthys olivaceus* against Experimental Edwardsiellosis by Formalin-killed *Edwardsiella tarda* in Combination with Oral Administration of Immunostimulants," *Fisheries Science* 65(4):527-530, Aug. 1, 1999.

(Continued)

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(57) **ABSTRACT**

The present disclosure concerns embodiments of a combination and/or composition comprising *bacillus*, and *yucca*, *quillaja* or both. Embodiments of methods of making and using the combination and/or composition also are disclosed herein. In some embodiments, the combination and/or composition may be used to improve feed conversion rates in animals. In some embodiments the animals are avians; in other embodiments, the animals are non-avians. Embodiments of the disclosed combination can comprise a first composition comprising *Quillaja saponaria*, *Yucca schidigera*, or both, and *Bacillus coagulans*. Embodiments of the disclosed composition can comprise *Quillaja saponaria*, *Yucca schidigera*, or both, and *Bacillus coagulans*.

(56)

References Cited

FOREIGN PATENT DOCUMENTS

WO WO 2005/092122 6/2005
WO WO 2015/155293 10/2015

OTHER PUBLICATIONS

- Calabotta et al., "Metabolism and Nutrition: Feed Additives II-175 Impact of a proprietary blend (PB) of *Quillaja saponaria* and *Yucca schidigera* and commercially available direct fed microbials (DFM) on performance of commercial broilers," *Poultry Science* 92(E-Suppl. 1):59-62, Jul. 24, 2013.
- Francis et al., "Quillaja saponins—a natural growth promoter for fish," *Animal Feed Science and Technology* 121(1-2):147-157, Jun. 9, 2005.
- Güroy et al., "Effect of dietary *Yucca schidigera* extract on growth, total ammonia-nitrogen excretion and haematological parameters of juvenile striped catfish *Pangasianodon hypophthalmus*," *Aquaculture Research* 45(4):647-654, Mar. 2014.
- International Search Report dated Jan. 30, 2015 from International Application No. PCT/US2014/062283.
- Irianto et al., "Probiotics in aquaculture," *Journal of Fish Diseases* 25:1-10, Jan. 2002.
- Kelly et al., "Effects of *Yucca schidigera* Extract on Growth, Nitrogen Retention, Ammonia Excretion, and Toxicity in Channel Catfish *Ictalurus punctatus* and Hybrid Tilapia *Oreochromis mossambicus* x *O. niloticus*," *Journal of the World Aquaculture Society* 34(2):156-161, Jun. 2003.
- Kensil et al., "Saponins as vaccine adjuvants," *Critical Reviews in Therapeutic Drug Carrier Systems* 13(1/02):1-55, Jan. 1, 1996 (Abstract only).
- Marais et al., "Control of Plant-Parasitic Nematodes with Bionematicides Nema-Q® An Extract of Quillaja Saponaria," *Journal of Nematology* 42(3):254-255, Sep. 1, 2010.
- Olusola et al., "The potentials of medicinal plant extracts as bio-antimicrobials in aquaculture," *International Journal of Medicinal and Aromatic Plants*, 3(3):404-412, Sep. 1, 2013.
- "Product Showcase: Direct-fed Microbe," *Poultry Times* pp. 14-15, Oct. 21, 2013.
- Stewart-Tull, "The Use of Adjuvants in Experimental Vaccines: IV. ISCOMS," *Methods in Molecular Medicine* 4:153-155, 1996.
- "Stop Stool Eating Chewable Tablets for Dogs," <http://www.drugs.com/vet/shop/stop-stool-eating-chewable-tablets-for-dogs.html> downloaded Oct. 21, 2014.
- Vinay et al., "Toxicity and dose determination of quillaja saponin, aluminum hydroxide and squalene in olive flounder (*Paralichthys olivaceus*)" *Veterinary Immunology and Immunopathology* 158(1):73-85, Mar. 22, 2013.
- Wang et al., "Anthelmintic activity of steroid saponins from C.H. Wright against (Monogenea) in goldfish," *Parasitology Research* 107(6):1365-1371, Aug. 6, 2010.
- Written Opinion dated May 20, 2015 from PCT Application No. PCT/EP2015/057732 (International Publication No. WO 2015/155293).

* cited by examiner