Lipid microencapsulation allows slow release of organic acids and natural identical flavors along the swine intestine

A. Piva, V. Pizzamiglio, M. Morlacchini, M. Tedeschi and G. Piv

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The purpose of the present work was to investigate the in vivo concentrations of sorbic acid and vanillin as markers of the fate of organic acids (OA) and natural identical flavors (NIF) from a microencapsulated mixture and from the same mixture non microencapsulated, and the possible consequences on the intestinal microbial fermentation. Fifteen weaned pigs were selected from 3 dietary groups and were slaughtered at 29.5 ± 0.27 kg of BW. Diets were (1) control; (2) control supplemented with a blend of OA and NIF microencapsulated with hydrogenated vegetable lipids (protected blend, PB); and (3) control supplemented with the same blend of OA and NIF mixed with the same protective matrix in powdered form but without the active ingredient coating (nonprotected blend, NPB). Stomach, cranial jejunum, caudal jejunum, ileum, cecum, and colon were sampled to determine the concentrations of sorbic acid and vanillin contained in the blend and used as tracers. Sorbic acid and vanillin were not detectable in pigs fed the control, and their concentrations were not different in the stomach of PB and NPB treatments. Pigs fed PB showed a gradual decrease of the tracer concentrations along the intestinal tract, whereas pigs fed NPB showed a decline of tracer concentration in the cranial jejunum and onwards, compared with the stomach concentrations. Sorbic acid and vanillin concentrations along the intestinal tract were greater (P = 0.02) in pigs fed PB compared with pigs fed NPB. Pigs fed PB had lower (P = 0.03) coliforms in the caudal jejunum and the cecum than pigs fed the control or NPB. Pigs fed the control or PB had a greater (P = 0.03) lactic acid bacteria plate count in the cecum than pigs fed NPB, which showed a reduction (P = 0.02) of lactic acid concentrations and greater (P = 0.02) pH values in the caudal jejunum. The protective lipid matrix used for microencapsulation of the OA and NIF blend allowed slow-release of both active ingredients and prevented the immediate disappearance of such compounds upon exiting the stomach.

HEADQUARTERS:
Vetagro S.p.A.
Via Porro 2 42124 Reggio Emilia - Italy
info@vetagro.com
infowesteu@vetagro.com
Tel: +39 0522 186 1500
Fax: +39 0522 92 7025
www.vetagro.com

OTHER LOCATIONS:
Vetagro Eastern Europe Kft.
Váci utca 81 1056 Budapest - Hungary
infoeasteu@vetagro.com
Tel: +39 0522 186 1500
Fax: +39 0522 92 7025

Vetagro Yem Ticaret A.Ş.
Levent Mahallesi, Cömert Sokak, No: 1
Yapı Kredi Plaza C blok Kat:17 No:40-41
Ofis:16 34330 Beşiktaş - Istanbul
info@vetagro.com
Tel: +90 212 318 9059
Fax: +90 212 317 4701

Vetagro Inc.
230 South Clark Street, # 320,
Chicago, IL 60604 - USA
infousa@vetagro.com
Tel: +1 773 610 2087
Fax: +1 773 442 0131