ORAL ADMINISTRATION AND EVALUATION IN PIGLETS OF TOBACCO SEEDS EXPRESSING ANTIGENIC PROTEINS AGAINST OEDEMA DISEASE

Luciana Rossi¹, Simona Vagni¹, Francesca Saccone¹, Serena Reggi², Antonella Baldi¹, Corrado Fogher³, Vittorio Dell’Orto¹

¹Università degli Studi di Milano, Dept. of Veterinary Sciences and Technology for Food Safety, Milan, I-20134; ²Plantechno, Vicomoscano-CR, I-26040; ³Botanic and Genetic Inst, U.C.S.C., Piacenza, I-29100.

OBJECTIVE
The aim of this study was to evaluate the immunological effects related to oral administration of tobacco seeds, expressing F18 fimbriae and VT2e-B subunit, as a model of oral vaccine against Oedema Disease in weaned piglets.

MATERIAL & METHODS
• TOBACCO SEEDS EXPRESSING ANTIGENIC PROTEINS
Genes coding for F18 adhesive fimbriae and for the subunit B of the VT2e toxin from a wild type Escherichia coli strain were placed into two cassettes of expression (f1) under control of GLOB promoter (Reggi et al, 2005) according to methods described by Rossi et al. (2004).

Tobacco seeds, transformed via Agrobacterium, were evaluated for the seed-specific expression of antigenic proteins against Oedema disease by immunoblotting (fig.2).

• MEASUREMENTS
-Zootecanical parameters (Average Daily Gain, Feed Intake, Body Weight) were registered in all the experimental periods.
-IgA and IgG amount were evaluated in the pre-challenge period in faecal and serum samples (by ELISA).
-Clinical evaluations (symptoms related to Oedema disease) were scored daily after challenge.

RESULTS
• PRE-CHALLENGE IgA LEVELS IN THE FACES
T1 group showed a higher level of IgA in the faces.

• ZOOTECNICAL PERFORMANCES
After challenge T1 and T2 showed better performances (ADG and FI) than CG.

• CLINICAL EVALUATION AFTER CHALLENGE
A general protective effect against the challenge strain was observed in all treated groups. T1, T2 and T3 showed a significant lower total score (respiration, palpebral edema, epiphora, and vitality) than CG. T1 showed also a faecal score lower than CG, T2 and T3. No differences were observed between T2 and T3, and no dose dependent relations were detected.

CONCLUSION
Oral immunization with tobacco seeds expressing F18+ VT2e-B antigens induced the increase of mucosal antibodies (IgA) in the faces and a protective effect against a subsequent VTEC F18+ E. coli challenge. Treated groups or control showed a better clinical status. Transgenic tobacco seeds could be an efficient delivery system of antigens against Oedema disease for oral immunization of piglets. This trial showed that multicomponent treatment (TSF18 and TSV2EB) received by T1 was the most effective.

REFERENCES