Summary

The intensification of freshwater fish production most frequently carried out in monocultures and with antibiotic protection favors increased transmission of pathogens. Mesophilic *Aeromonas* sp. rods are the dominant etiological agent of bacterial diseases in fish in Polish aquaculture causing MAI/MAS infections, and significant losses in carp and trout populations. The variety of antigenic structures of *Aeromonas* sp. impedes the development of an effective vaccine for immunoprophylaxis of infections in fish, which is an alternative method to antibiotic therapy. The development of the antigenic composition of the vaccine should be preceded by an analysis of the O-antigen structures of autochthonous strains representing serological groups among which pathogenic species are prevailing. The aim of this doctoral dissertation was to carry out structural and immunochemical studies of the lipopolysaccharides and O antigens of *Aeromonas* bacteria belonging to the dominant O6 serogroup using chemical and serological methods, high-resolution MALDI-TOF-MS spectroscopy techniques, and ^{1}H and ^{13}C NMR spectroscopy. The research showed that *A. hydrophila* JCM 3968 O6 and *A. veronii* bv. *sobria* K557 strains synthesize O antigens containing two types of polysaccharides (homopolysaccharide and heteropolysaccharide). In the O-specific polysaccharide of strain K557, isolated from carp, only 4-amino-4,6-dideoxy-L-mannose residues (α-L-Rhap4NAc, L-perosamine) were identified, and the differences in the structure were related to their substitution pattern. In turn, the O antigen of strain JCM 3968, a reference for serogroup O6, contained a polysaccharide with a trisaccharide repeating subunit composed of two α-L-Rha*p*4NAc residues and one α-D-Gal*p*NAc residue and a homopolymer of α-(1→2)-L-Rha*p*4NAc with a similar structure to that in strain K557. Noteworthy is the presence of Rha*p*4NAc, which has not been identified so far in the L-configuration in the antigenic structures of Gram-negative bacteria.

Structural analysis of the O-specific polysaccharides, combined with serological studies (Western blotting and ELISA) facilitated identification of common epitopes determining cross-reactivity in heterologous systems and antigenic determinants responsible for their specificity. Based on the obtained results, it was proposed to divide the O6 serogroup into two immunotypes: O6a represented by *A. hydrophila* JCM 3968 and O6b for which the local isolate of *A. veronii* bv. *sobria* K557 is proposed as the reference strain.

Keywords: *Aeromonas* sp., lipopolysaccharide (LPS), O antigen (O-PS), 4-amino-4,6-dideoxy-L-mannose, NMR

Dworaczek Katarzyna