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<th>Program</th>
<th>NUCLEU PN 09-13 03 10</th>
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<tr>
<td><strong>Project title (ENG):</strong></td>
<td>Biotechnological solution for high organic load municipal/industrial wastewater treatment based on aerobic granular sludge systems</td>
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<tr>
<td><strong>Project title (RO):</strong></td>
<td>Solutii biotehnologice de epurare a apelor uzate menajere/industriale cu incarcari organice ridicate utilizand sisteme cu namol activ aerob granular</td>
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<tr>
<td><strong>Duration</strong></td>
<td>2009-2014</td>
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<td><strong>Team Leader</strong></td>
<td>Costel Bumbac</td>
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<td><strong>Summary (short description) ENG</strong></td>
<td>Wastewater treatment technology based on aerobic granular activated sludge SBR systems for high organic load wastewaters. Scope: wastewater treatment plants (especially for industrial wastewater with high organic load). Overview: Experiments have shown that the formation of granular sludge under aerobic conditions is possible and seems a promising technique for wastewater with high organic load and / or potentially toxic substances. The granule size is in close correlation with the size of the anoxic area and thus directly proportional to the intensity of anoxic/anaerobic processes. The aerobic granular sludge obtained proved adaptability and stability in terms of high pollutant concentrations removal, successfully removing, in less than 8 hours concentrations of up to 3 g/L of phenol and overall organic load in the reactor. Aerobic granular sludge microbial structure is dense and strong, as defined, smooth, regular and clear outer surface; The granules are visible as separate entities in the mixed solution, both in the mixing and settling stage; The system has a high capacity of biomass retention and tailing; It is able to withstand high flow rates; can withstand high organic loading rate; It is less vulnerable to the toxic organic compounds from wastewater than the sludge in suspension. Excellent settling ability simplifies the separation of the treated effluent from the aerobic granular sludge. By the application of correct hydrodynamic selection factors, the biomass from an aerobic sequentially batch reactor (SBR), has succeeded in the development of aggregates of microbial origin with a granular structure which has turned out effective and stable in treating wastewaters with high shock loading and toxic substrate (phenol).</td>
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| **Summary (short description) RO** | Tehnolgie de epurare a apelor uzate cu incarcari organice ridicate utilizand sisteme secentiale cu namol activ aerob granular Domenu de aplicabilitate: Statii de epurare a apelor uzate .(in special ape uzate industriale cu incarcari organice ridicate) Prezentare generala : Experimentele au aratat ca formarea namolului granular in conditii aerobe este posibila si pare o tehnica promitatoare de epurare a apelor uzate cu incarcare organica ridicata si/sau potential toxica. Dimensiunea granulelor este in stransa legtura cu dimensiunea zonei anoxice a acestora si implicit direct proportional cu intensitatea proceselor anoxice anaerobe in sistemul AGSBR. Namolul aerob granular obtinut a dovedit adaptabilitate si stabilitate avand in vedere concentratiile ridicate de poluant, reusind sa indeparteze cu eficienta ridicata, in mai putin de 8 ore concentratii de pana la 3 g/l de fenol si incarcarea organica globala a reactorului. Namolul granular aerob are structura microbiana densa si puternica, forma definita, netedea, regulata si suprafata exterioara clara; granulele sunt vizibile ca entitati separate in solutii mixte atat in faza de amestecare cat si in cea de decantare; are o capacitate mare de retentie a biomasei si de decantare; este capabil de a rezista la debite mari; sa
poata rezista la rate de incarcare organice mari; este mai putin vulnerabil la compusii organici toxici din apele uzate decat namolul in suspensie. Capacitatea excelenta de decantare a granulelor aerobe simplifica separarea efluentului tratat din namolul granular. Prin aplicarea unui regim de alimentare si selectie corect asupra biomasei dintr-un reactor secvential aerob (SBR), s-a reusit dezvoltarea unor agregate microbiene cu structura granulara ce au dovedit ulterior eficiente de epurare ridicate si stabilitate la socuri de incarcare si substrat toxic (fenol).

### Dissemination of results

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<tr>
<th>Type</th>
<th>Authors</th>
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<tr>
<td></td>
<td>Bumbac, C.; Dinu, R.L.; Patroescu, V.I.;</td>
<td>Evaluation of Aerobic Granular Sludge SBR Performances, 1st Danube – Black Sea Regional Young Water Professionals Conference “Innovations in the field of water supply, sanitation and water quality”, 14 – 15 iunie 2011, Bucharest</td>
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<td></td>
<td>Bumbac C., Ionescu I., Tiron O., Badescu V.,</td>
<td>Aerobic Granular Sludge Continuous Flow Reactor for Dairy Wastewater Treatment, IWA 6th Eastern European Young Water Professionals Conference - Istanbul 2014</td>
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