were compared. It was established, that the created method gives opportunity to predict value of drawing out force from ravel course of different yarns and different types of knitted fabrics produced with different grades of knitting machines.

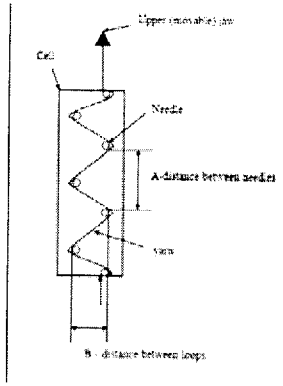

Fig. 1. Model of knitted fabric sample

EFFECT OF ALKALINE MATERIAL GRANULE SIZE ON ABILITY OF ADJUSTMENT THE BUFFER CAPACITY

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pH control in biotechnological processes like anaerobic digestion is one of the key factors to ensure a high efficiency biogas production process. pH decrease occurs during digestion process due to the rapid acetogenesis which lead to the inhibition of the methanogenesis and further digestion process is limited. The efficiency of anaerobic digestion reactor decreases dramatically and production of methane (CH4) in digester stops if pH level drops under pH 6.6. Such problem is common for batch and single-stage digesters with high biomass solid content.

Described problem can be solved by creating inorganic alkaline material with possibility to control pH with soluble alkalis enclosed in the matrix of material. Alkali-activating material technology provides the development of such material. This technology is based on an activation of the alumina and silica rich raw materials under highly alkaline environment. Highly cross linked alumino-silica material structure is formed during activation process and alkalis are enclosed in the material structure which can provide slow leaching of free alkalis from the material structure in water medium ensuring increase of pH in the medium. In this research porous alkaline composite

material was developed as pH controlling agent for the biogas production. Two mixture compositions with different Si/Al and Si/Na ratio were created. The effect of grain size of material was investigated in order to provide different leaching rates of composite material. Granules with fraction size 1-2mm, 2-4mm and 4-8mm and cubical specimen with dimension 2x2x2 were tested. Weighted material (3.0+0.1g) was immersed in deionized water bath with volume 100ml and after every 24 hours samples was placed in a new bath. Titration method was applied to determine buffer capacity of the material.

The pH level of water medium increased up to pH 11.6 during first day and final pH value was decreased to 7.8. Alkali leaching can be increased by 40% by changing mixture composition of alkaline material. The granule size factor was negligible for leaching rate of alkaline material due to the high porosity of material. Research provides that composite material has a potential to control pH environment in biotechnologies.

A COMPUTATIONAL ANALYSIS OF HYGROTHERMAL PERFORMANCE OF ENERGY-EFFECTIVE COMBINATIONS OF CONSTRUCTION MATERIAL AND PLASTER

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The current methodology of a building envelope design includes several key aspects as the mechanical performance, energy performance, durability, resistivity to outer aggressive environment and last but not least aesthetical criteria. In this paper, we focus on energy performance of chosen material combinations in respect to their response to outer climatic conditions evaluated by both heat and moisture balances and energy intake/loss.

Trend of civil engineering is to make constructions sustainable and resistible with as minimum energy costs as possible during their lifetime. Therefore sophisticated materials are brought in to eliminate heat loss due to poor heat-moisture performance. We are already familiar with special plasters which in combination with a special type of load-bearing material provide enough thermal insulation even when no additional thermal insulation is in use. In order to improve the materials in respect to their insulating capabilities, special admixtures are usually added (for example light aggregates or PCM). This paper is a part of larger study aiming to reveal, simulate and prove the significance of such additives.

As a first step of our approach, we present a numerical simulation of selected building envelopes. These are combinations of hollow brick, concrete or AAC with normal plasters or thermal-insulating plasters provided with an