

Characterization of potential CLA-producing strains according to LA tolerance

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Introduction

Linoleic acid (LA) present in ruminants diet goes through a series of reactions within the rumen, called the biohydrogenation pathway. This pathway ends up converting LA to stearic acid (C18), but several intermediate products are formed, such as conjugated linoleic acid (CLA) isomers, which have been extensively studied for their potential bioactive properties^{1,2}. Different ruminal bacteria are involved in this process, however, strains of lactobacilli, bifidobacteria and propionibacteria isolated from human intestine and dairy products have also demonstrated the ability to produce those fatty acids³. Most *in vitro* CLA production assays normally test potential producing strains by culturing them in the presence of a pure LA solution at 0.5 mg/mL or less⁴. However, possibly there are some strains that can tolerate higher concentrations of LA and if they are producers, CLA yields may probably be higher.

Objective: The major aim of this work was to determine the maximum LA concentration that potential CLA-producing strains can tolerate in further *in vitro* production assays.

Methods

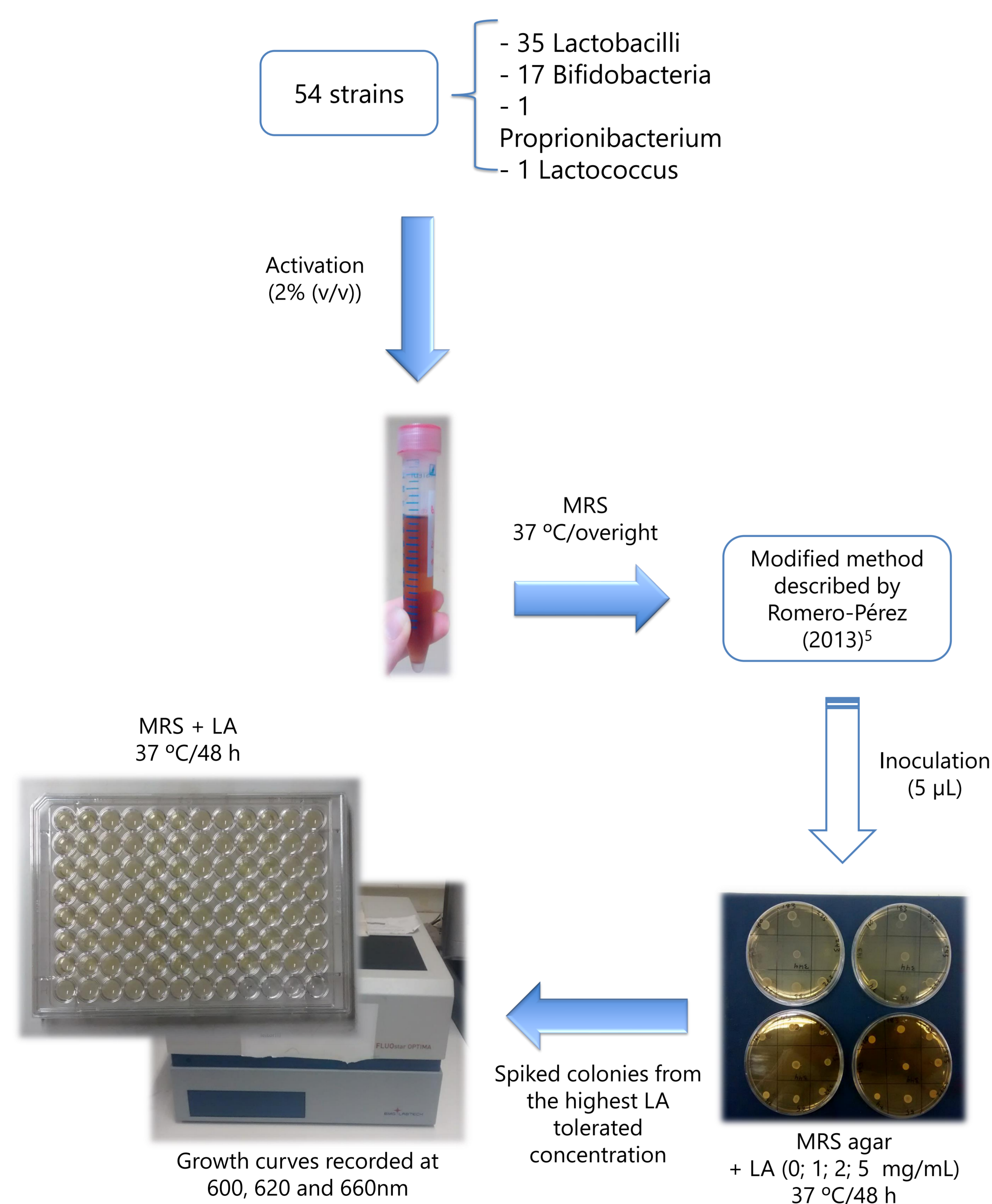


Figure 1. Flow diagram of the experimental design.

Results

Among the strains tested, 18 (33.3%) could not grow at the lowest LA concentration assayed (Figure 2), having considered their tolerance below 1 mg/mL. A group of 16 strains (29.6%) showed growth at 1 mg/mL of LA, 8 (14.8%) tolerated up to 2 mg/mL and 12 (22.2%) up to 5 mg/mL (Figure 2).

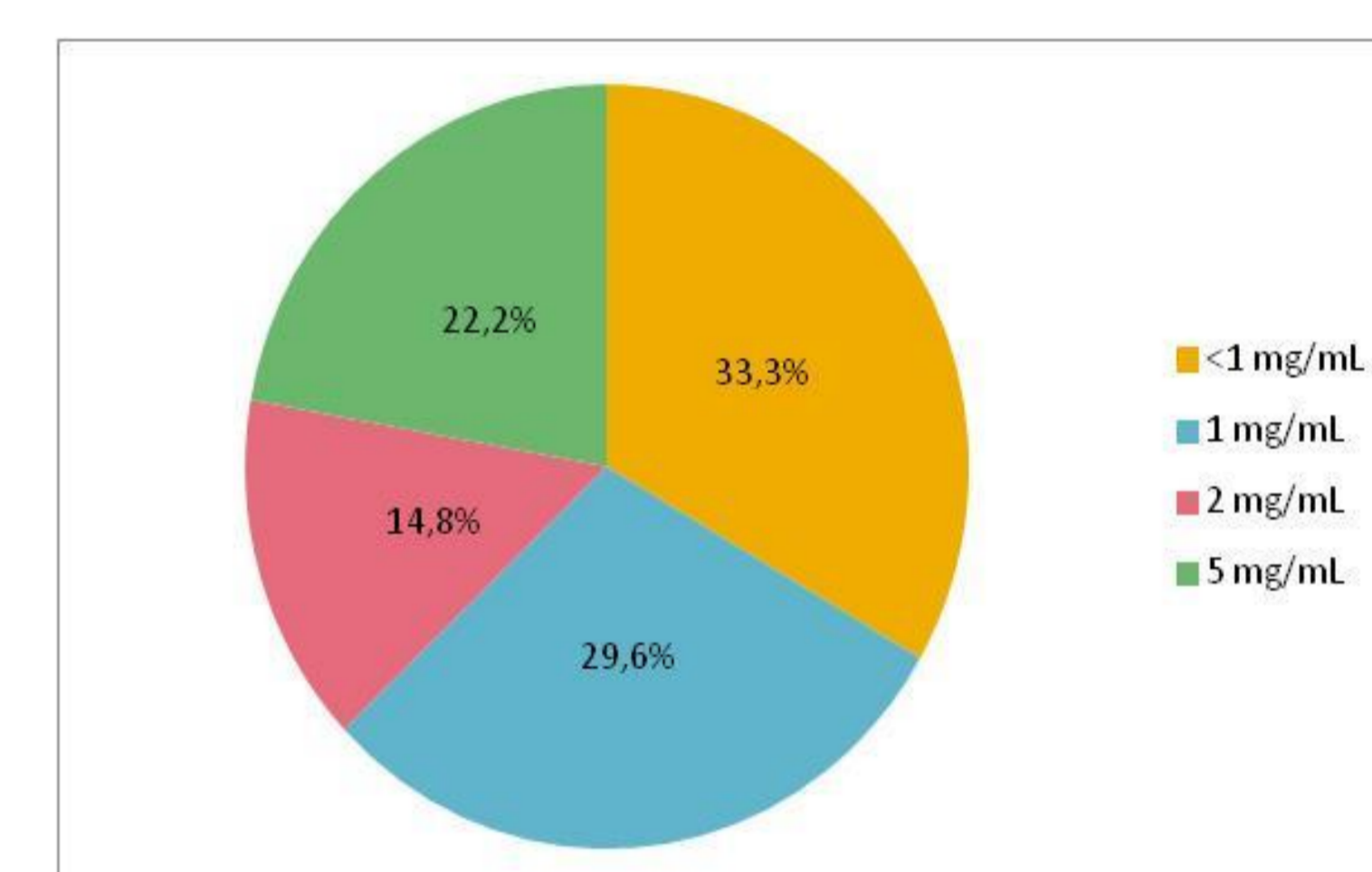


Figure 2. Percentage distribution of the tested strains according to maximum LA tolerated concentration.

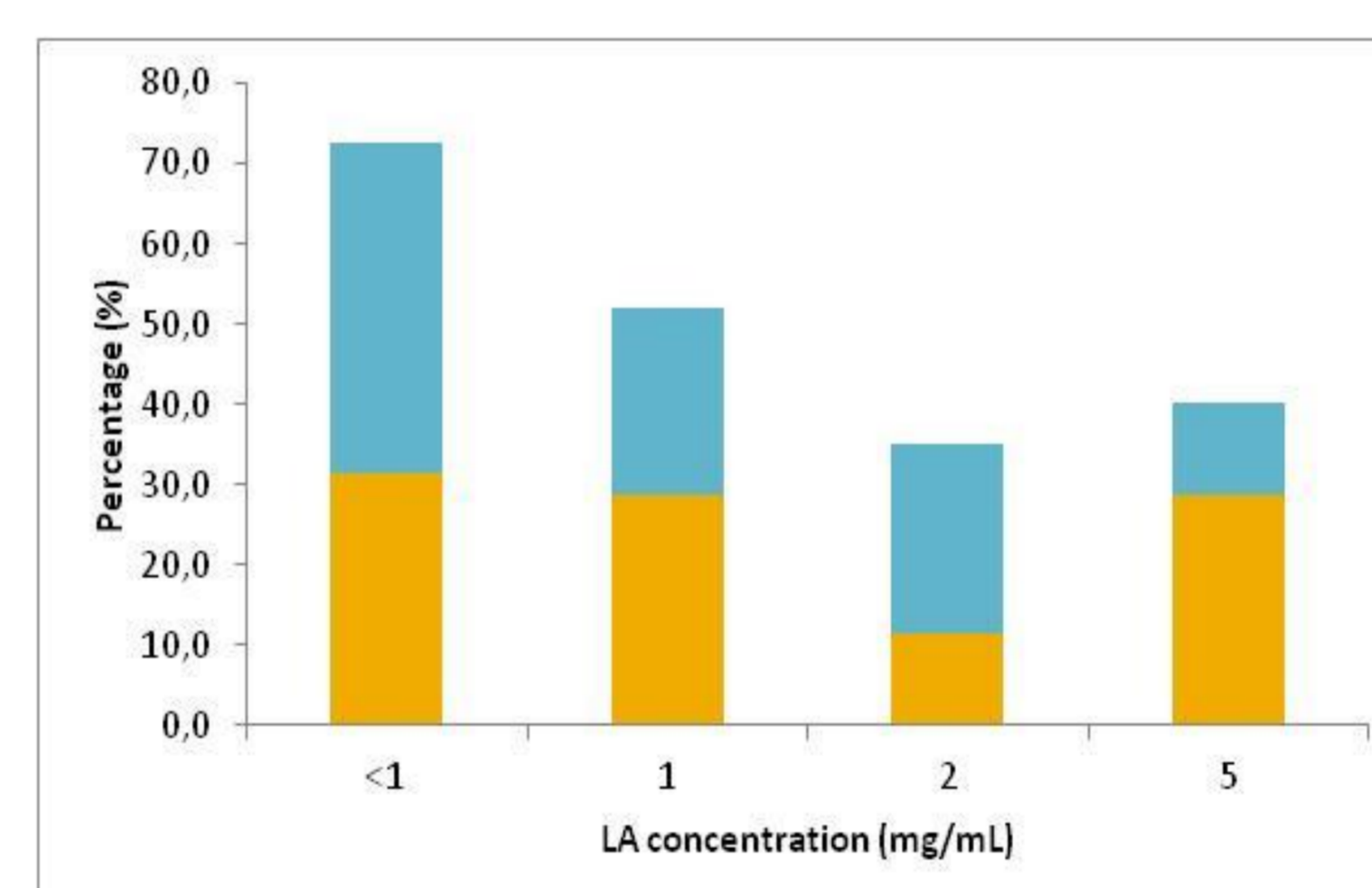


Figure 3. Distribution of lactobacilli (■) and bifidobacteria (■) strains according to maximum LA tolerated concentration.

At 5 mg/mL lactobacilli was the dominant group (28.6% of total lactobacilli), whereas at 2 mg/mL it was bifidobacteria that prevailed (23.5% of total bifidobacteria).

At <1 mg/mL and 1 mg/mL the distribution of lactobacilli and bifidobacteria was similar (Figure 3). Propionibacterium and lactococcus strains could grow at 1 mg/mL.

Conclusions

In conclusion, potential CLA-producing strains exhibit different LA tolerance degrees, being lactobacilli the more tolerant at the highest LA concentration assayed. Currently overlooked, this is an important parameter to consider in future production tests.

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