Can storage plant proteins be transformed into biosurfactants ? The case of lupin.

Lupin belongs to plants traditionally grown in Poland and many countries around the world, mainly for animal feed purposes and as a green fertilizer. In the latter role it behaves particularly well due to its unique ability of fixing the atmospheric nitrogen, which it owes to a symbiosis with root bacteria (e.g., *Rhizobium*). The main obstacle to the use of lupin as animal feed on a large scale, or even as a component of food for humans, is the presence of different anti-nutritional substances, e.g. alkaloids. These days, however, specially cultivated varieties with low alkaloid content (so-called "sweet") are easily available on the market. Unfortunately, their cultivation is associated with the need for stronger protection against diseases and pests, which requires the use of often considerable doses of chemical plant protection products. Both traditional "bitter" and modern "sweet" varieties are, however, a very rich source of proteins with a favorable amino acid composition and many other ingredients with valuable physicochemical properties. The underexplored potential of lupin was already known over 100 years ago. In 1917, a special party was given in Hamburg, where a lupin soup was served at a table covered with a lupin fibre tablecloth, a lupin “steak” baked in lupine oil and seasoned with the lupin extract. As a starter, bread containing about 20% of lupin was offered with a lupin margarine and cheese made from the lupin protein, and finally - lupin liqueur and lupin coffee. Guests of the party could even wash their hands with lupine soap...

In spite of the many promising potential applications, the lupin proteins remain to this day largely unknown from a scientific point of view. As part of this project, systematic physicochemical studies are planned to provide a complete description of the surface properties of the proteins isolated from different lupin species and varieties. For this purpose, the ability to reduce surface tension - one of the basic features determining effectiveness of e.g., body wash or laundry liquids. Other important features of all surface active products are the foaming and emulsifying capacities, which also depend on surface activity. These will also be the subject of research within the project. The results and conclusions obtained during the present project will help in the future development of various cosmetic, food or pharmaceutical products based on lupin extracts.