

DESCRIPTION FOR THE GENERAL PUBLIC

The existence of neurodegenerative diseases as well as other twenty-first century ailments called "civilization diseases" are mainly correlated with the modern lifestyle. Furthermore, the genetic predispositions are considered to play an important role, although the study results are not conclusive. These diseases usually reveal with aging, and by the fact that people live longer, the possibility of developing any of them becomes more likely. Disturbances associated with the production, secretion and action of dopamine in the brain can cause Parkinson's disease, schizophrenia, depression and addiction propensity. Parkinson's disease is one of the most common neurodegenerative disorder in the modern world. Dysfunction in dopamine secretion in brain is caused by the damage of dopaminergic neurons in the midbrain. This disease concerns mainly the elderly people and the incidence in the population over 55 years of age is approximately 1% and after 75 year old - 3%. However, recently an increase of incidence among younger people has been observed [www.parkinson.org]. The traditional treatment includes medications containing L-3,4-dihydroxyphenylalanine (L-DOPA) and inhibitors of L-DOPA decarboxylase, for example benserazid or carbidopa. Unfortunately, administration of these medicines has many side effects such as: gastrointestinal disorders (nausea, vomiting and constipation), headaches, fluctuations in blood pressure, insomnia or hypersomnia. It turned out that natural medicine is effective against Parkinson's disease. The plant *Mucuna pruriens* was used in Ancient Indian medicine, called Ayuwerda, as an aphrodisiac, in the treatment of male infertility and to cure people suffering from Parkinson's disease. Studies proved significant content of L-DOPA in *Mucuna pruriens* and confirmed its effectiveness. Other plant, well-known in Poland, containing L-DOPA is the fava bean (*Vicia faba*). Also in this case, there is evidence of positive effects in diminishing the symptoms of Parkinson's disease with reduced side effects which occur during standard therapy [Apaydin et al., 2000]. It was found that it is possible to increase the amount of L-DOPA in germinating seeds by treating them UV radiation, microwave radiation, fish protein hydrolyzate, lactoferrin and oregano extract. Also solid-state bioconversion using mold *Rhizopus oligosporus* caused an increase in the content of L-DOPA. *R. oligosporus* is used in the production of traditional Indonesian product – tempe. It was proved that this type of fermentation increases the nutritional value of the product comparing to raw material. The advantage of fava bean therapy beside the improvement of health without significant side effects would be lower cost of treatment and greater social acceptance for natural cure.

Basic research will involve the monitoring changes of quantity and quality of protein during fermentation of fava beans by *R. oligosporus* and determination of the L-DOPA level during this process. Those proteins, which content changes will be correlated with the changes in L-DOPA content, will be isolated, and then solid-state bioconversion by *R. oligosporus* with addition of isolated proteins will be performed and L-DOPA content measured. The aim of the project is to indicate protein or proteins which are susceptible to transformation to L-DOPA by enzymes produced by the aforementioned mold. The research will help to comprehend the protein profile of fava beans and to understand the process of synthesis of L-DOPA during the bioconversion. Study results could be the basis to conduct subsequent projects aimed at creating an alternative dietary supplement or functional food product that could be included in the daily diet of people suffering from Parkinson's disease.

Apaydin H., Ertan S., Ozekmekçi S. (2000) Broad bean (*Vicia faba*)—a natural source of L-Dopa—prolongs “on” periods in patients with Parkinson's disease who have on-off” fluctuations. *Movement Disorders* (15)164-6.