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Beneficial health substances from berries and minor crops –

- How to increase their concentration
in cultivated species, eliminate losses
in processing and enhance dietary use

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Adaptogenic medicinal plants as minor crops: cultivation, yield and suitability for Finland

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Several medicinal plants have special, so-called adaptogenic effects. The term "adaptogen" was defined by Brekhman & Dardymov (1969). According to their definition the adaptogenic effect increases the general capacity of the body to adjust and increase the body's resistance, in addition it has an overall normalising effect on the function of the organism and it is harmless and has no side effects.

Since some of these plants originate from cold environmental conditions, they have been the objects of introduction and acclimatisation research during 1989-2006 in Mikkeli, South Finland, (61°44' N, 27°18'E). Growth, biomass production, quality and suitability for cultivation have been studied of American ginseng (*Panax quinquefolius*), Thorny eleuthero or "Siberian ginseng" (*Eleuterococcus /Acanthopanax senticosus*), "Peru ginseng", Maca (*Lepidium meyenii*), Maralroot (*Leuzea carthamoides*, syn. *Rhaponticum carthamoides*) and Roseroot (*Rhodiola rosea*).

Maca is the newest adaptogen plant and it can be cultivated in Finland as an annual from transplantation. The individual plants are small, each one produces 25-50 g fresh leave and 5-15 g fresh root. Eleuthero wintered at Mikkeli level well, the average dry root weights of the 5th and 6th year old plants were 287 and 497 g/plant, respectively, with 0.16-0.19 % content of Eleuteroid B and 0.27-0.29 % of Eleuteroid E. The perennial maralroot can be cultivated in any part of Finland and its growing techniques have been elaborated. The expected dry herb, root and seed yields from the second and third years are 3-3.5 t/ha, 1-3 t/ha and 30-570 kg/ha, respectively. The contents of its main compound, 20-hydroxyecdysone, were similar to the levels reported by other researches, being 0.05-0.1 % in leaves, 0.1-0.25 % in roots and 0.3-0.55 % in seeds. The american ginseng has wintered well, but its growth was slow. The average weight of the commercial size roots were 28-35 g during the fourth and fifth years. The total ginsenoside content was 3.88-4.36 %. Its cultivation needs special shadow techniques and the biggest risk in its cultivation is that it seems to be prone to damage by fungi.

After a 10-year experimental period the first version of the cultivation technique of the

domestic rosenroot was issued for growers. In commercial cultivation rosenroot propagated by transplanting of seedlings. The root yield can be harvested mechanically after four or five growing seasons. The estimated fresh and dried root yield is 200-250 kg and 40-70 kg/100 m², respectively. There is commercial rosenroot preparation on the Finnish market extracted from domestically grown raw materials. Some of the studied adaptogen medicinal plants may have some beneficial role in the well-being of humans or animals. After their successful introduction into Finland, they should be the objects of physiological studies and they may have some role in the production of special minor crops.